Retinal Vessel Narrowing: A Prehypertensive or Masked Hypertensive State?

To the Editor:

Based on analyses of Rotterdam Study data, Ikram et al. concluded that retinal vessel narrowing might precede the development of systemic hypertension. The authors have made a great effort to optimize the ophthalmoscopic technique and achieved a more sensitive method than those used previously. On the other hand, baseline blood pressure measurements were rather "old-fashioned," composed of 2 readings taken during a single visit. In an analogy to the authors’ conclusion that, compared with their methodology, “(standard ophthalmoscopy) may underestimate the extent of arteriolar narrowing and thereby the risk of hypertension,” one may suggest that, in some subjects, blood pressure at baseline was underestimated by the standard clinic measurement. Thus, if in addition to the 2871 subjects excluded because of hypertension at screening, another 10% to 20% (~430 subjects) had masked hypertension at baseline, the true incidence of new hypertension (n=808) is probably overestimated. Therefore, a finding of retinal vessel narrowing in a subject with normal clinic blood pressure may indicate either a prehypertensive state (as the authors imply), or, not less likely, a masked hypertensive state. Ambulatory blood pressure monitoring may identify the true condition.4

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Response: Retinal Vessel Narrowing: A Prehypertensive or Masked Hypertensive State?

We read with interest the letter by Ben-Dov concerning the question of whether a finding of retinal vessel narrowing in a person with normal clinic blood pressure at baseline indicates either a prehypertensive or a masked hypertensive state. Prevalence of masked hypertension varies from 9% to 23%.1 Within our large cohort, it was not feasible to have ambulatory baseline blood pressure measurements. However, we did take blood pressures at the first follow-up examination (1993–1994) similar to measurement at baseline shortly after the baseline screening (1990–1993).2 Although these data are not equivalent to the ambulatory blood pressure monitoring, we feel that a large proportion of people identified with hypertension at this follow-up examination may actually have had masked hypertension at baseline.

We reanalyzed our data by excluding not only the 2871 persons with hypertension at baseline but also an additional 179 persons who met the definition of hypertension at the first follow-up examination. Of the remaining 2540 persons, 1787 participated in the second follow-up examination and were included in the current analyses. After this additional exclusion, 720 persons instead of 808 were diagnosed with incident hypertension. One SD decrease in retinal arteriolar diameters at baseline was associated with a 38% increased risk of incident hypertension [odds ratio (OR), 1.38; 95% CI, 1.24 to 1.52]. Smaller venular diameters were less markedly associated with incident hypertension (OR, 1.13; 95% CI, 1.02 to 1.25). Each SD decrease in the resulting arteriolar/venular diameter ratio showed a 28% increase in the risk of incident hypertension (OR, 1.28; 95% CI, 1.15 to 1.42). Additional adjustments for other cardiovascular risk factors did not affect these associations.

After exclusion of people who were identified with hypertension shortly after baseline, the association between baseline retinal vessel diameters and incident hypertension remained significant and was not even attenuated, making it more likely that retinal vessel narrowing may indeed indicate a prehypertensive state. However, the current approach does not provide the final answer, because we still may have missed a substantial proportion of cases with masked hypertension. We agree with the recommendation made by Ben-Dov that “ambulatory blood pressure monitoring may identify the true condition,” and if retinal images of sufficient quality in such a cohort are available, it should not be too difficult to solve this problem.

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